CLAIMS

1. A method comprising:

receiving a pilot signal, a first data signal and a second data signal;

demodulating the first data signal using the pilot signal as a demodulation reference; and

demodulating at least a portion of the second data signal using the first data signal as a demodulation reference.

2. The method of claim 1, further comprising, after the first data signal is demodulated, decoding symbols in the demodulated first data signal to produce data bits corresponding to the first data signal, re-encoding the data bits corresponding to the first data signal into symbols corresponding to the first data signal, and using the symbols corresponding to the first data signal to provide a demodulation reference based on the first data signal.

3. The method of claim 1, wherein the second data channel is a demodulated using a demodulation reference based upon the first data signal and the pilot signal in combination.

4. The method of claim 1, wherein the second data signal comprises a data traffic signal and the first data signal comprises a rate indicator signal that identifies a data rate corresponding to the data traffic signal.

5. The method of claim 1, wherein for each frame, the first, second and pilot signals are buffered and wherein demodulating the first data signal and second data signal is performed on each frame after the entire frame has been buffered.

6. The method of claim 1, wherein for each frame, the first, second and pilot signals are buffered; wherein demodulating the first data signal is attempted before the entire frame has been buffered; and wherein demodulating the second data signal is performed after the first data signal is successfully demodulated.

7. The method of claim 6, wherein a portion of the second data signal that is received after the first data signal is successfully demodulated is demodulated when received.

8. The method of claim 6, wherein a portion of the second data signal that is buffered before the first data signal is successfully demodulated is demodulated after the first data signal is successfully demodulated.

9. The method of claim 8, wherein demodulating the buffered portion of the second data signal is performed in parallel with demodulating the portion of the second data signal received after the first data signal is successfully demodulated.

10. The method of claim 6, further comprising estimating a received signal to noise ratio (SNR) from the first data signal and the pilot signal after the first data signal is successfully demodulated.

11. The method of claim 1, wherein demodulating the first data signal is attempted upon receiving the first data signal; wherein before the first data signal is successfully demodulated, the second data signal is demodulated using the pilot signal as a demodulation reference; and wherein after the first data signal is successfully demodulated, the second data signal is demodulated using the first data signal as a demodulation reference.

12. The method of claim 1, wherein a turbo scaling factor is adjusted for turbo decoding depending on whether the demodulation reference is based on the pilot signal alone or the pilot signal and the first signal.

13. The method of claim 1, wherein a demodulation scaling factor for high-order modulation is adjusted for turbo decoding depending on whether the demodulation reference is based on the pilot signal alone or the pilot signal and the first signal.

14. The method of claim 1, wherein the first data signal has a data rate which is less than a data rate of the second data signal.

15. The method of claim 1, wherein the pilot, first data and second data signals comprise CDMA signals.

16. The method of claim 1, wherein the method is implemented in a base station that is configured to receive the pilot, first data and second data signals from a mobile station.

17. A receiver for a multi-path communication link comprising:

a receiver subsystem; and

a processing subsystem;

wherein the receiver subsystem is configured to receive a pilot signal, a first data signal and a second data signal; and

wherein the processing subsystem is configured to

demodulate the first data signal using the pilot signal as a demodulation reference and

demodulate at least a portion of the second data signal using the first data signal as a demodulation reference.

18. The receiver of claim 17, wherein the processing subsystem is configured to, after demodulating the first data signal, decode symbols in the demodulated first data signal to produce data bits corresponding to the first data signal, re-encode the data bits corresponding to the first data signal into symbols corresponding to the first data signal, and use the symbols corresponding to the first data signal to provide a demodulation reference based on the first data signal.

19. The receiver of claim 17, wherein the processing subsystem is configured to demodulate the second data channel using a demodulation reference based upon the first data signal and the pilot signal in combination.

20. The receiver of claim 17, wherein the second data signal comprises a data traffic signal and the first data signal comprises a rate indicator signal that identifies a data rate corresponding to the data traffic signal.

21. The receiver of claim 17, further comprising a buffer, wherein for each frame, the processing subsystem is configured to store the first, second and pilot signals in the buffer and to demodulate the stored first data signal and second data signal after the entire frame has been buffered.

22. The receiver of claim 17, further comprising a buffer, wherein for each frame, the processing subsystem is configured to store the first, second and pilot signals in the buffer; wherein the processing subsystem is configured to attempt to demodulate the first data signal before the entire frame has been buffered; and to demodulate the second data signal after the first data signal is successfully demodulated.

23. The receiver of claim 22, wherein the processing subsystem is configured to demodulate a portion of the second data signal that is received after the first data signal is successfully demodulated when the portion is received.

24. The receiver of claim 22, wherein the processing subsystem is configured to demodulate a portion of the second data signal that is stored before the first data signal is successfully demodulated after the first data signal is successfully demodulated.

25. The receiver of claim 24, wherein the processing subsystem is configured to demodulate the stored portion of the second data signal and the portion of the second data signal received after the first data signal is successfully demodulated in parallel.

26. The receiver of claim 22, wherein the processing subsystem is configured to estimate a received signal to noise ratio (SNR) from the first data signal and the pilot signal after the first data signal is successfully demodulated.

27. The receiver of claim 17, wherein the processing subsystem is configured to attempt to demodulate the first data signal upon receiving the first data signal; to demodulate a portion of the second data signal received before the first data signal is successfully demodulated using the pilot signal as a demodulation reference; and to

demodulate a portion of the second data signal received after the first data signal is successfully demodulated using the first data signal as a demodulation reference.

28. The receiver of claim 17, wherein the processing subsystem is configured to adjust a turbo scaling factor for turbo decoding depending on whether the demodulation reference is based on the pilot signal alone or the pilot signal and the first data signal.

29. The receiver of claim 17, wherein the processing subsystem is configured to adjust a demodulation scaling factor for high-order modulation for turbo decoding depending on whether the demodulation reference is based on the pilot signal alone or the pilot signal and the first data signal.

30. The receiver of claim 17, wherein the first data signal has a data rate which is less than a data rate of the second data signal.

31. The receiver of claim 17, wherein the receiver comprises a CDMA receiver and wherein the pilot, first data and second data signals comprise CDMA signals.

32. The receiver of claim 17, wherein the receiver comprises a base station that is configured to receive the pilot, first data and second data signals from a mobile station.